Master of Science in Technology 2018-2020

Credits: 120 ECTS

Programme Director: Professor Niina Nurmi

Additional information: IDBM programme website

Learning outcomes

Graduates of the IDBM programme will be able to drive design-oriented innovation and lead development initiatives within global environments.

This includes the ability to:

- use a design approach in product, service and business development
- lead and collaborate in multi-cultural and multi-disciplinary teams, deepening and connecting one’s own disciplinary expertise to a wider business context
- drive change and development activities in organisations
- communicate concepts and ideas both verbally as well as visually at an operative (tactical) and strategic level
- understand and utilise academic research in defining and approaching problems in systematic and systemic manner

IDBM Major studies 40 ECTS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>JOIN-E7006</td>
<td>IDBM Challenge</td>
<td>5 cr</td>
<td>I</td>
</tr>
<tr>
<td>MUC-E9009</td>
<td>Corporate Entrepreneurship and Design</td>
<td>5 cr</td>
<td>I</td>
</tr>
<tr>
<td>ELEC-E9900</td>
<td>Networked Partnering and Product Innovation</td>
<td>5 cr</td>
<td>II</td>
</tr>
<tr>
<td>26E04350</td>
<td>Business Model Design</td>
<td>5 cr</td>
<td>II</td>
</tr>
<tr>
<td>JOIN-E7005</td>
<td>IDBM Industry Project</td>
<td>15 cr</td>
<td>III-V</td>
</tr>
<tr>
<td>26E04903</td>
<td>IDBM Capstone: Global Virtual Teamwork *</td>
<td>5 cr</td>
<td>V, II</td>
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</tbody>
</table>

*The course is recommended to be completed in period V during 1st year of studies or period II during the 2nd year of studies

Responsibile professor at Aalto School of Chemical Engineering: Professor Lauri Rautkari
Specialisation Studies 30 ECTS

At the School of Chemical Engineering (CHEM) a student can specialise in Chemical, Biochemical and Materials Engineering including subjects of Biomass Refining, Biotechnology, Chemical and Process Engineering, Chemistry, Fibre and Polymer Engineering, Functional Materials and Sustainable Metals Processing.

The specialisation area studies aim to

- Form solid foundation of students’ expertise in his/her specialised field.
- Provide profound engineering basis for working in an international, competitive and highly innovative environment.
- Deepen students’ theoretical and practical knowledge base in specialisation area.

IDBM students at CHEM are requested to draft their personal study plan at the beginning of their studies with academic and learning services support. The approved personal study plan includes, among other courses, a detailed content of the chosen specialisation area. The selection of the specialisation area is subject to students’ academic background and other relevant prior knowledge.

**Biomass Refining**

- specialisation area can be any combination of courses belonging to the Biomass Refining major.

**Biotechnology**

- three compulsory courses: CHEM-E3100 Biochemistry 5 cr, CHEM-E3120 Microbiology 5 cr and CHEM-E3140 Bioprocess technology II 5 cr
- additionally choose courses from the Biotechnology major to fulfil 30 cr target

**Chemical and Process Engineering**

- specialisation area can be any combination of courses belonging to the Chemical and Process Engineering major.

**Chemistry**

- four compulsory courses: CHEM-E4110 Quantum mechanics and Spectroscopy 5 cr, CHEM-E4120 Quantitative Instrumental Analysis 5 cr, CHEM-E4130 Chemistry of the Elements 5 cr and CHEM-E4150 Reactivity in Organic Chemistry 5 cr
- additionally choose courses from the Chemistry major to fulfil 30 cr target

**Fibre and Polymer Engineering**

- specialisation area can be any combination of courses belonging to the Fibre and Polymer Engineering major.

**Functional Materials**
• two compulsory courses: CHEM-E5120 Interfaces and nanomaterials 5 cr and CHEM-E5135 Biomimetic materials and technologies 5 cr,
• additionally choose courses from the Functional Materials major to fulfil 30 cr target.

Sustainable Metals Processing

- specialisation area can be any combination of courses belonging to the Sustainable Metals Processing major.

Master’s thesis 30 ECTS

| Master's thesis | 30 cr | Spring/Autumn |

Responsibile professor at Aalto School of Electrical Engineering: Professor Jaan Praks

Specialisation Studies 30 ECTS

Studies at IDBM ELEC provide you with great opportunity to deepen your core competence in technology achieved at bachelor’s level and combine it with wider design and innovation framework. The specialisation areas at Aalto School of Electrical Engineering include Automation and Electrical Engineering, Computer, Communication and Information Sciences and Nano and Radio Sciences providing the full range of core competences to excel in modern ICT and Robotics driven developments.

The specialisation area studies aim to

- Provide specialisation and engineering skills for working in an international, competitive and highly innovative environment.
- Establish solid foundation of students’ selected expertise field in electrical engineering.
- Deepen students’ theoretical and practical knowledge base in their specialisation area.

Students select 30 cr of specialisation studies from the following fields:

Control, Robotics and Autonomous Systems
Communications Engineering
Translational engineering

Other fields from the School of Electrical Engineering are also possible upon agreement.
Master's thesis 30 ECTS

Responsibile professor at Aalto School of Engineering: Professor Katja Höltä-Otto

Specialisation Studies 20 ECTS

The specialisation areas of IDBM ENG include Civil and Structural Engineering, Energy Technology, Geoengineering, Geoinformatics, Mechanical Engineering, Real Estate Economics, and Surveying and Planning. The specialisation area studies aim to

- Form solid foundation of students’ expertise in his/her specialised field
- Provide profound engineering basis for working in an international, competitive and highly innovative environment
- Deepen students’ theoretical and practical knowledge base in their specialisation area

Choose 20 cr from one of the minor programmes below:

- Building Technology
- Advanced Energy Solutions
- Geoengineering and Mineral Based Materials
- Geoinformatics
- Mechanical Engineering
- Real Estate Economics
- Human-Centered Living Environment
Master’s thesis 30 ECTS

Responsible professor at Aalto School of Science: Professor Patrick Rinke

SCI Minor 25 ECTS

SCI IDBM minor studies provide students with the opportunity to deepen core competence achieved at the bachelor’s level. The specialisation areas at the School of Science include Engineering Physics, Mathematics, Systems and Operations Research, and Computer Science (including Computer Science, Software and Service Engineering, and Human-Computer Interaction minors). Students need to complete a 25 cr minor in one of these areas.

The objective of these specialisation areas is to

- Build a solid foundation of expertise in the students’ specialised field.
- Provide profound engineering or natural/computer science basis for working in an international, competitive and highly innovative environment.
- Deepen the students’ theoretical and practical knowledge base in their specialisation area.

Compulsory SCI minor, choose one

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>SCI3068</td>
<td>Computer Science</td>
<td>25 cr</td>
</tr>
<tr>
<td>SCI3075</td>
<td>Engineering Physics</td>
<td>25 cr</td>
</tr>
<tr>
<td>SCI3099</td>
<td>Human-Computer Interaction (must be confirmed)</td>
<td>25 cr</td>
</tr>
<tr>
<td>SCI3076</td>
<td>Mathematics</td>
<td>25 cr</td>
</tr>
<tr>
<td>SCI3069</td>
<td>Software and Service Engineering</td>
<td>25 cr</td>
</tr>
<tr>
<td>SCI3077</td>
<td>Systems and Operations Research</td>
<td>25 cr</td>
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Master's thesis 30 ECTS

Master's thesis 30 cr Spring/Autumn